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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MARTINEZ, JOSEPH P

ART UNIT

PAPER NUMBER

2873

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/601,910	AMANAI, TAKAHIRO	
	Examiner	Art Unit	
	Joseph P. Martinez	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 4, 18 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 3, 4, 18 and 20, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

For purposes of examination, the phrase "such as" will be omitted from each of claims 3, 4, 18 and 20.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being fully anticipated by Burger (6381072).

Re claim 1, Burger teaches for example in fig. 18, an image pickup lens unit comprising; an optical system (320); and a plurality of optical elements (322) which form the optical system, wherein: a plurality of optical elements, having optical axes which are aligned (col. 28, ln. 40-41), are mutually cemented (col. 15, ln. 27-30); side surfaces (342) of the optical elements disposed in a surface which expands linearly in a direction of the optical axes (fig. 18); and outer peripheries (wherein the office interprets the area outside of the lens 322 to be the outer periphery) of each of the optical elements contact outer peripheries of adjacent optical elements (fig. 18).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 2, 4-12, 15-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burger (6381072).

Re claims 2 and 15, Burger further teaches for example in fig. 18, an image pickup unit having a plurality of optical elements which is produced by: preparing a plurality of optical element arrays (324) in which a plurality of optical elements (322) are disposed; aligning optical axes of a plurality of the optical elements (col. 28, ln. 40-41); cementing (col. 15, ln. 27-30) a

plurality of the optical element arrays in a direction of the optical axes of the plurality of the optical elements; and cementing (col. 15, ln. 27-30) outer peripheries (wherein the office interprets the area outside of the lens 322 to be the outer periphery) of each optical elements so as to contact outer peripheries of adjacent optical elements.

But, Burger fails to explicitly teach cutting between the neighboring optical elements in a direction the optical axes of a plurality of the optical elements.

However, within the same field of endeavor, Bowen et al. teaches for example in fig. 9B, cutting (col. 5, ln. 47-49) between the neighboring optical elements in a direction the optical axes of a plurality of the optical elements.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Burger with Bowen et al. to include cutting the cemented optical element in order to provide an efficient and cost effective means to produce a desired lenslet array from a bulk produced lenslet array.

Re claim 16, Burger further teaches for example in fig. 18, an image pickup unit having at least three optical elements formed by a first optical element (328), a second optical element (324), and a third optical element (324) produced by produced by: preparing a first optical element array (328) in which a plurality of the first optical elements (326) are disposed, a second optical element array (324) in which a plurality of the second optical elements (322) are disposed, a third optical element array (324) in which a plurality of the third optical elements (322) are disposed; aligning optical axes (col. 28, ln. 40-41) of the first optical element and the third optical element and cementing (col. 15, ln. 27-30) the first optical element array and the

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third optical element array in a direction of the optical axes of the plurality of the optical elements; and cementing (col. 15, ln. 27-30) outer peripheries (wherein the office interprets the area outside of the lens 322 to be the outer periphery) of each optical elements so as to contact outer peripheries of adjacent optical elements.

But, Burger fails to explicitly teach cutting between the neighboring optical elements in a direction the optical axes of a plurality of the optical elements.

However, within the same field of endeavor, Bowen et al. teaches for example in fig. 9B, cutting (col. 5, ln. 47-49) between the neighboring optical elements in a direction the optical axes of a plurality of the optical elements.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Burger with Bowen et al. to include cutting the cemented optical element in order to provide an efficient and cost effective means to produce a desired lenslet array from a bulk produced lenslet array.

Re claim 4, Bowen et al. further teach for example, an image pickup lens unit which satisfies a formula $TT < 20 \text{ mm}$, wherein a total cutting length in a direction of optical axes of a plurality of the optical elements is defined as a distance TT (col. 5, ln. 57-59, wherein the office interprets the thickness of the lens arrays and spacers is less than 20mm and therefore the cutting length in the direction of the optical axis falls within the claimed range).

Re claim 5, Burger further teaches for example in fig. 18, all optical elements have a side surface (wherein the office interprets the surface in between 322 and 322 to be side surfaces)

which is disposed in a same surface (fig. 18); and the same surface indicates a surface (342) which expands linearly in a direction along the optical axis (fig. 18).

Re claim 6, Bowen et al. further teach for example, the optical element arrays are formed by disposing the optical elements in two-dimensionally (col. 3, ln. 16-18, wherein Bowen et al. suggest both surfaces having optical power).

Re claim 7, Burger further teaches for example in fig. 18, an image pickup lens unit which is formed by 10 or fewer optical elements (fig. 18) having a power and including at least a positive lens (322) and at least a negative lens (326) which is disposed so as to neighbor the positive lens (fig. 18).

Re claim 8, Bowen et al. further teach for example, an image pickup lens unit having 10 or fewer air surfaces (fig. 3, col. 3, ln. 18-20).

Re claim 9, Burger further teaches for example, a surface except an optical surface in one of the optical elements is treated so as to absorb a light (col. 10, ln. 54-59).

Re claims 10 and 11, Burger teaches for example in fig. 18, an optical filter or hood (col. 10, ln. 54-59, wherein the office interprets filters and hoods to include hard stops masks or opaque zones) having a side surface which is disposed in the same surface as the side surface of

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the optical elements is cemented to one of the optical elements (col. 10, ln. 66-67 to col. 11, ln. 1-2).

Re claim 12, Burger further teaches for example in fig. 2, an image pickup device (40) which is provided with the image pickup lens unit.

Re claim 17, Bowen et al. further teach for example, the optical element has a flange section (fig. 14, not labeled, section between lens and protrusion 123) which is disposed on an optical surface through which a light passes and on an outer peripheral section (fig. 14, not labeled, section after protrusion 123) on the optical surface; a protruding section is formed on an outer peripheral section of the flange section (the office interprets fig. 14, not labeled, section after protrusion 123 to be protruding in a direction orthogonal to the optical axis); an interval is formed between the protruding sections which neighbors each other in a direction of the optical axis (fig. 3, not labeled, end sections of lens arrays 10).

Re claim 19, Burger in view of Bowen et al. teach the image pickup lens as disclosed above, including the use of various lenses.

But, Burger in view of Bowen et al. fail to explicitly teach θ is 60 degrees or smaller in the optical element under condition that the θ is defined as an angle made between the optical axis in an optical surface in the optical element and a normal in an effective diameter of the optical surface.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have θ be 60 degrees or smaller in the optical element under condition that the θ is defined as an angle made between the optical axis in an optical surface in the optical element and a normal in an effective diameter of the optical surface, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering an optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Burger in view of Bowen et al. to have θ be 60 degrees or smaller in the optical element under condition that the θ is defined as an angle made between the optical axis in an optical surface in the optical element and a normal in an effective diameter of the optical surface to effectively direct light through the image pickup device.

2. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burger (6381072) in view of Bowen et al. (6324010) and further in view of Horiguchi (4733096).

Re claims 13 and 14, Burger in view of Bowen et al. teach the image pickup device as disclosed above.

But, Burger in view of Bowen et al. fail to explicitly teach the image pickup elements are cemented to an optical element which forms a final surface in the image pickup lens unit.

However, within the same field of endeavor, Horiguchi teaches for example, the image pickup elements (sensor elements 44, fig. 2) are cemented to an optical element which forms a final surface in the image pickup lens unit (col. 2, ln. 19-21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Burger in view of Bowen et al. to include cementing the image pickup elements to the optical element as taught by Horiguchi in order to provide increased sensor output.

Allowable Subject Matter

Claim 3 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Specifically regarding claim 3, Burger teaches the state of the art of lens arrays.

But, Burger fails to explicitly teach an image pickup lens which satisfies a formula $1.0 < MD/ED < 4.0$, wherein a maximum outermost diameter of the image pickup lens unit in a cross section which crosses orthogonally to the optical axes is defined as an MD and a maximum beam effective diameter in an optical system which is formed by a plurality of the optical elements is defined as an ED, as claimed.

Claims 18 and 20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Specifically regarding claim 18, Burger teaches the state of the art of lens arrays.

But, Burger fails to explicitly teach an image pickup unit wherein conditions of $ST/TD < 0.7$ (condition 1) and $MT/TD < 0.5$ (condition 2) are satisfied under the condition that: TD is defined as a surface interval on the optical axis from a first surface of the optical system which is formed by the optical elements that are cemented together to the last surface of the optical system; ST is defined as a total length of the air intervals on the optical axis; and MT is defined as a maximum value of the length of the air intervals on the optical axis, as claimed.

Specifically regarding claim 20, Burger teaches the state of the art of lens arrays.

But, Burger fails to explicitly teach an image pickup unit which is used in the image pickup lens unit having a cementing surface wherein a condition of $0 < |\phi/\phi_A| < 0.5$ is satisfied under the condition that: ϕ is defined as a power in the lens surfaces; and ϕ_A is defined as a power in an entire optical system in the image pickup lens unit, as claimed.

Response to Arguments

Applicant's arguments with respect to claims 1, 2 and 4-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph P. Martinez whose telephone number is 571-272-2335. The examiner can normally be reached on M-F 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
10-26-04



Hung Xuan Dang
Primary Examiner